

REMARKS

Following entry of the above amendments, claims 2-24 will be pending. Of these, claims 16-22 stand withdrawn from consideration. Claim 2 has been amended to clarify its distinction over the cited art, and to end the claim with a period, instead of a semi-colon, as was mistakenly indicated in a previous amendment. Claim 3 has been amended to clarify the claim. Claim 7 has been amended to remove an instance of the word "the" in the last clause. (This word was inadvertently added, without being properly noted, in the previous listing of claims.) Claim 7 has also been amended to change "coupled" to "mechanically connected." Claim 12 has been amended for clarity without intended change in scope.

Indefiniteness Rejection

Claims 7-9 stand rejected as indefinite for lack of proper antecedent basis. Claim 7 has been amended to render the issue moot. Withdrawal of the rejection is respectfully requested.

Prior Art Rejections

Andersson

Claims 2-5 and 12-15 stand rejected under 35 U.S.C. 102(b) as being anticipated by Andersson, U.S. Patent No. 5,175,393 ("Andersson"). Withdrawal of the rejections is respectfully requested for at least the following reasons.

Andersson discloses a launch unit for a mortar projectile, which causes the launch unit to be automatically removed from the barrel after the projectile is launched. Col. 1, lines 24-27. According to Andersson, the launch unit 6 consists of individual components that are rigidly attached to one another. Col. 2, lines 40-46. The launch unit 6 includes a cartridge tube 7 that contains a propellant cartridge 8, and plurality of increment powder charges 10 placed around the cartridge tube 7 and the propellant

cartridge 8. Col. 2, lines 10-34. The launch unit 6 also contains a girdle 24 that pushes against the rear end of a sustainer 5, which in turn pushes against a projectile body 4 during launch. Col. 3, lines 18-26. In the launch procedure, ignition of powder strips 8a and of the increment charges 11 produces pressurized gasses that cause the girdle 24 to break free of the rest of the launch unit 6. Col. 4, lines 31-39 (pressurized gasses cause "the girdle lip to break in register with the hooks 26"). The girdle 24 is then pressed against the sustainer until it exits the launch tube, at which time it breaks apart. Col. 4, lines 40-50. The remainder of the launch unit 6 is expelled out of the launch tube by the action of pressurized gasses on the wing elements 20a. Col. 4, lines 51-64. Andersson does not disclose mechanical coupling between a propelling charge holder and a projectile body (the launch unit 6 is not mechanically coupled to either the sustainer 5 or the projectile 4). Andersson also does not disclose separation of a propelling charge holder from a projectile body during flight, after a projectile has exited from a launcher (the cartridge tube 7 and the increment charges 10 separate from the projectile 4 while still in the launch tube). Andersson further does not disclose multiple propelling charge holder segments, separate from external propelling charge increments, that are separable from one another during flight (the cartridge tube 7 is a single piece).

Claim 2 as amended recites a projectile that includes a projectile body mechanically coupled to a propelling charge holder that includes multiple propelling charge holder segments that are separable from the projectile body and from one another during flight of the projectile, after the projectile has exited from a launcher. Andersson does not teach or suggest 1) a propelling charge holder that is mechanically coupled to a projectile body; and 2) use of multiple propelling charge holder segments that are separable from the projectile body and from each other during flight, after the projectile has exited from a launcher. The components identified in the Action as corresponding to the propelling charge holder (5, 25, 24, 6, 7) are not mechanically

coupled to Andersson's projectile 4, which is taken as corresponding to the recited projectile body. Andersson teaches only that the girdle 24 is jammed against a shoulder 25 of the sustainer 5, col. 4, lines 2-10, and that the sustainer 5 is pressed against and docked with the projectile body 4, col. 4, lines 10-14 and 25-30. Merely pressing one part against another is not mechanical coupling, and such a pressing without mechanical coupling occurs at least in the pressing of the girdle 24 against the shoulder 25 or the shoulder 25a. Since Andersson does not teach or suggest the recited mechanical coupling, claims 2-5 are patentable over Andersson.

In addition, Andersson does not teach or suggest a propelling charge holder that includes multiple propelling charge holder segments (which are different from the separately-recited external propelling charge increments), that are separable from the projectile body and from one another during flight of the projectile, after the projectile has exited from a launcher. Andersson's cartridge tube 7 is a single piece, and Andersson does not teach or suggest separation of any part of the launch unit 6 from another during projectile flight. The girdle 24 separates from other parts of the launch unit 6 while the unit is still in the launch tube, and fragments as it leaves the launch tube, but Andersson does not teach or suggest any separation of multiple charge holder segments from the projectile body and from one another during flight of the projectile, after the projectile has exited from a launcher. Thus for another reason claims 2-5 are patentable over Andersson.

Dependent claim 3 as amended recites an internal propelling charge increment in a chamber defined by and within the multiple propelling charge holder segments. Andersson does not teach or suggest these additional features. Andersson's propellant cartridge 8 is within a cylindrical cartridge tube 7. Andersson does not teach or suggest that the cartridge tube 7 is anything but a single piece, and thus does not teach or suggest multiple propelling charge holder segments that define a chamber for receiving an internal propelling charge increment. Therefore for still another reason claims 3-5

are patentable over Andersson.

Claim 4 further recites propelling charge holder segments that have holes therein. Andersson has holes 7a in the cartridge tube 7, which is a single, unitary piece that is rigidly connected to other components of the launch unit 6. Col. 2, lines 10-25 and lines 40-47. Andersson, however, does not disclose holes in multiple propelling charge holder segments, and therefore claim 4 is patentable over Andersson for a further reason.

Claim 12 recites a projectile that includes a projectile body coupled to propelling charge holder segments where the propelling charge holder segments have a curved free shape, and wherein an inward radial force provided by external propelling charge increments is applied to the propelling charge holder segments to combine them to form the propelling charge holder. Andersson does not teach or suggest external propelling charge increments that apply an inward radial force to multiple propelling charge holder segments to combine the segments to form a propelling charge holder. In Andersson, the external propellant charges 10 are placed around the cartridge tube 7, which is a single, unitary component of the launch unit 6. Thus, the external propellant charges 10 (taken as corresponding to the increments) do not operate to combine the multiple components identified in the Action as constituting the propelling charge holder (5, 25, 24, 6, 7). Since Andersson does not teach or suggest all of the recited elements of claim 12, claims 12-15 are patentable over Andersson.

Dependent claim 13 recites a projectile with fins hingedly coupled to the projectile body wherein the retracted fins supply at least part of the inward radial force to combine the propelling charge holder segments to form the propelling charge holder. Andersson discloses but does not illustrate foldable wrap-around stabilizing fins on the projectile that deploy after the projectile leaves the barrel. Col. 1, line 67 – Col. 2, line 2. There is no indication that Andersson's stabilizing fins provide any inward radial force to combine propelling charge holder segments together. Therefore, claim 13 is patentable over

Andersson for at least this additional reason.

Dependent claim 14 additionally recites an igniter holder with an annular flange that supplies at least part of the inward radial force to the propelling charge holder segments to combine them to form the propelling charge holder. Andersson does not teach or suggest this additional feature. Andersson discloses an ignition device 9 that is not described in detail, but includes an ignition charge and primer. Col. 2, lines 15-17. The portion of Figure 2, identified in the Action as the “annular flange” does not appear to supply at least part of an inward radial force to combine propelling charge holder segments. In fact, the ignition device appears only to be in contact with the cartridge tube 7. Because the cartridge tube 7 is a single, unitary piece, the “annular flange” cannot assert an inward radial force on multiple propelling charge holder segments. Thus, Andersson does not disclose an all of the features of claim 14 and claim 14 is patentable over Andersson for an additional reason.

Claim 15 recites a projectile where the hooked ends of the propelling charge holder segments engage a flange on an aft protrusion of the projectile body where the removal of the inward radial force causes the hooked ends to disengage from the flange. In Andersson, the girdle 24 has an outer lip 24a, an inner lip 24b, and an inside 24c. The inside 24c of the inner lip 24b forms a seat for mating the girdle to the conical shoulder 25 of the rear end of the sustainer (or 25a of the projectile). Because the inside 24c is not a hooked end and the outer lip 24a does not engage the rear end of the sustainer or projectile, claim 15 is patentable over Andersson for an additional reason.

Combination of Andersson and Brandt

Claims 6-11, 23, and 24 stand rejected under 35 U.S.C. 103(a) as being obvious over Andersson in view of Brandt, U.S. Patent No. 1,879,840 (“Brandt”). Withdrawal of the rejections is respectfully requested for at least the following reasons.

Brandt discloses a bladed projectile where the rear of the projectile is equipped with blades that are moveable from a folded position to an unfolded position. Page 1, lines 60-72. The blades 12 are retained in a folded position against the body of the projectile 1 with forward clips 33. Upon issuing from the launching tube, the blades move from the position shown in Figure 3 (folded) to that of Figure 2 (unfolded). Page 2, lines 115-119. Brandt discloses a combination of both fixed blades and hinged blades coupled to the projectile body forward of the propelling charge holder. As depicted in Figure 5 of Brandt, each pivoting blade at the forward end of the propelling charge holder is pivoted on a shaft 19 carried by a fixed blade 20. Page 2, lines 120-129. Neither Andersson nor Brandt teach or suggest all of the elements of the claimed projectile either alone or in combination.

Claim 6 depends from claim 2, which is patentable over Andersson for the reasons given above. Brandt does not make up for the failure of Andersson to teach or suggest all of the features of claim 2 as amended. Therefore claim 6 is patentable over Andersson and Brandt, either alone or in combination.

Claim 7 recites a projectile that includes, *inter alia*, fins, where the fins press against the propelling charge holder segments of the propelling charge holder. In both Andersson and Brandt, the propelling charge holder does not separate during the flight of the projectile. The charge holder in Andersson separates from the launch unit when the projectile exits the barrel. The charge holder in Brandt is rigidly attached to the projectile body and also does not detach during flight. Further, neither Andersson nor Brandt teach or suggest a projectile where the fins press against propelling charge holder segments. Andersson discloses foldable stabilizing fins mounted to the projectile body, but not fins that press against multiple propelling charge holder segments. Similarly, the blades in Brandt do not press against multiple propelling charge holder segments. Thus, for at least these reasons, Andersson and Brandt do not teach or suggest all of the features of claim 7, and claims 7-11 are patentable over both

references, either alone or in combination.

Dependent claim 8 recites a projectile wherein a center portion of the propelling charge holder segments is closer to a centerline of the projectile than the ends of the propelling charge holder segments. Neither Andersson nor Brandt teach or suggest this element. In Andersson, the sustainer 5 and shoulder 25 do not have a central portion that is closer to the centerline of the projectile than the ends of the same segments. Andersson's sustainer 5 is not described in detail but appears to have a uniform cross-section except for the conical shoulder 25, which is tapered at one end. The tapered shoulder 25 provides at least one end of the sustainer 5 that is closer to the centerline of the projectile than a middle portion of the sustainer. The propelling charge holder in Brandt also has a uniform cross-section and therefore fails to disclose the claimed feature. Therefore claim 8 is patentable over both references, either alone or in combination, because neither Andersson nor Brandt teach or suggest all of the recited features of claim 8.

Dependent claim 9 recites a projectile where one end of the propelling charge holder segments is a hooked end that engages an aft protrusion of the projectile body. As discussed above, the outer annular lip 24a of the girdle 24 in Andersson does not engage an aft protrusion on the projectile body. Instead, the inside 24c of the inner lip 24b forms a seat for mating the launch unit 6 to the conical shoulder 25 of the rear end of the sustainer (or 25a if the launch unit is mated with the projectile). Because there is not a hooked engagement between the launch unit and the projectile body, claims 9-11 are patentable over both Andersson and Brandt for another reason.

Claim 10 recites a projectile in which an aft protrusion of the projectile body includes a flange that is engaged by the hooked ends of the propelling charge holder segments. Neither Andersson nor Brandt disclose a flange on an aft protrusion of the projectile body. Andersson discloses a conical shoulder 25 for mating with the inside 24c of the inner lip 24b of the girdle 24, but does not teach or disclose a flange. Brandt

also does not disclose or suggest a flange on an aft protrusion of the projectile body. Since neither Andersson nor Brandt teach or suggest all of the features of claim 10, claim 10 is patentable over both references for still another reason.

Claim 11 recites a projectile with a notch in the fins into which the hooked ends of the propelling charge holder segments partially protrude when the fins are retracted. Andersson does not teach blades or fins that have notches into which hooked ends of propelling charge holder segments partially protrude. Brandt also does not disclose or suggest notches in the blades. The forward clips of Brandt do not engage the hooked ends of the propelling charge holder segments when the fins are retracted. Thus, neither Andersson nor Brandt disclose or suggest all of the features of claim 11, either alone or in combination and claim 11 is patentable over both references for still another reason.

Claim 23 recites a projectile where the blades of the fins have a notch into which parts of the propelling charge holder segments protrude when the fins are retracted. As discussed, neither Andersson nor Brandt disclose fins with a notch. Thus, claims 23 and 24 are patentable because neither Andersson nor Brandt teach or suggest all of the features of claim 23, either alone or in combination.

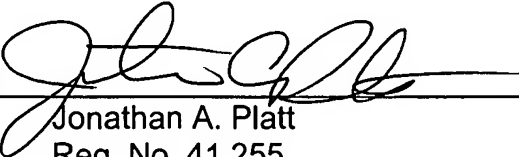
Claim 24 depends from claim 23 and is also patentable for the additional reasons discussed above with regard to claim 2. Namely, Andersson does not teach or suggest propelling charge holder segments that are detachable during flight of the projectile. As such, claim 24 is patentable over Andersson and Brandt because both references fail to teach or suggest all of the features of claim 24.

Conclusion

For at least the foregoing reasons, withdrawal of the final claim rejections is respectfully requested, in which event this application would be in condition for allowance. Should the Examiner believe that a telephone interview would be helpful to

expedite favorable prosecution, the Examiner is invited to contact Applicant's undersigned attorney at the telephone number listed below.

Respectfully submitted,
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